ODYSSEE-MURE fit-4-55 (2022-2025)
30 years in monitoring energy efficiency in Europe

Eurostat Energy Statistics Working Group meeting
On line workshop November 15th 2023

Didier Bosseboeuf (ADEME) : Project coordinator

This project has received funding from the European Union's LIFE programme under grant agreement No. 101075902

ODYSSEE-MURE 2022-2025 work program in brief

- **Program** : LIFE-CET, **Topic**: Towards an effective implementation of key legislation in the field of sustainable energy policy

- **Duration** : 30 months, starting October 2022

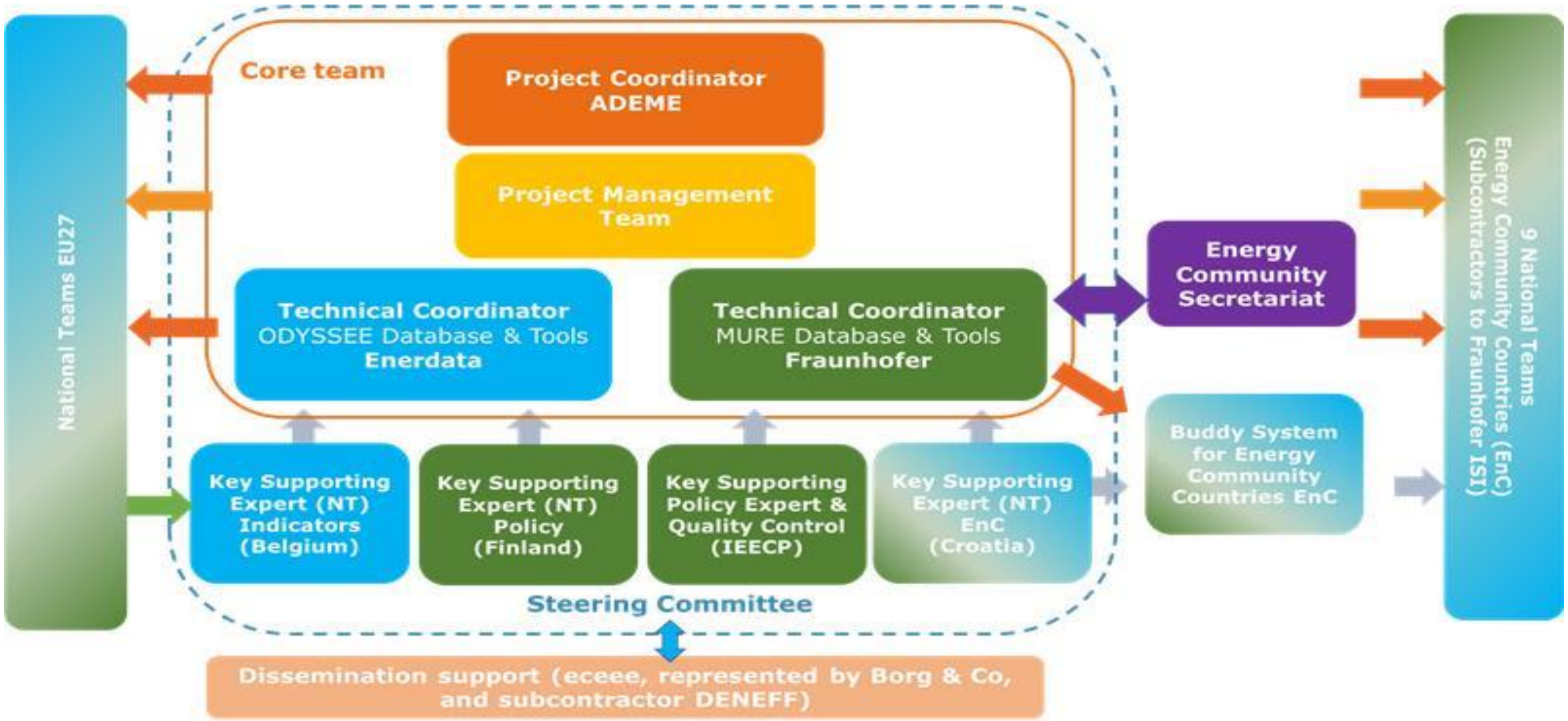
- **40 partners** from 27 EU countries (mainly represented by energy efficiency agencies) and 9 EnCs, coordinated by ADEME with a technical coordination (Enerdata and FHG-ISI)

- The project relies on 2 data bases:
  - **ODYSSEE:** 200 energy efficiency indicators and 4 related facilities; 3 updates; new updating process, using more widely EUROSTAT data and horizontal sources
  - **MURE** : 3000 national energy efficiency policies and ex-post impact evaluation and related facilities

- Integration of a web-based Policy Assessment Tool Policy radar (based on AI/Web scraping methods)

- **Dissemination** : country profiles; sectoral profiles, national reports; newsletters; scoreboard; presence in social media

ODYSSEE-MURE
A collaborative project with a decentralised data collection (36 countries, 120 experts)



ODYSSEE-MURE

Overview Tools Publications Q&A Events Contact Partners

A DECISION-SUPPORT TOOL FOR ENERGY EFFICIENCY POLICY EVALUATION

ABOUT THE ODYSSEE-MURE PROJECT

Comprehensive monitoring of efficiency trends and policy evaluation in EU countries, Switzerland and Energy Community countries.

LEARN MORE

ABOUT ODYSSEE

Database on energy efficiency indicators and energy consumption by end-use and their underlying drivers in industry, transport and buildings.

Learn more

ABOUT MURE

Database on energy efficiency policies and measures by country in industry, transport and buildings.

Learn more

LATEST NEWS

24 APRIL 2023

The project is organising its first meeting in Zagreb on April 24-26 2023, followed by a training on energy efficiency indicators and impact evaluation of policies dedicated for new comers of the project.

MARKET DIFFUSION

DECOMPOSITION

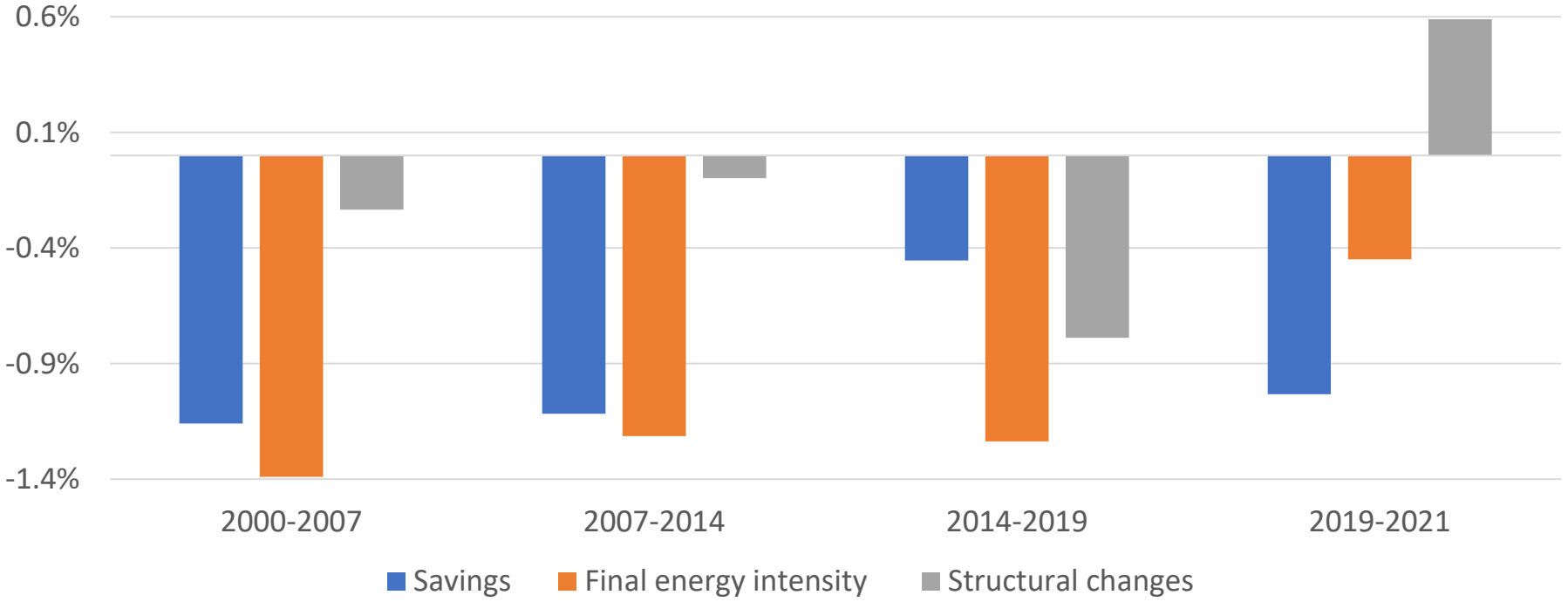
COMPARISON

ENERGY SAVING

ENERGY EFFICIENCY SCOREBOARD

Energy intensity : An easy doing indicator, official but only a proxy of energy efficiency.

- Since 2014 energy efficiency only explains half of the final energy intensity reduction.
- Different types of structural changes (e.g. towards less energy intensive sectors (services) and industrial branches, saturation effects, higher value added products…) have contributed as much to the intensity reduction until 2019; they acted in the opposite direction after 2019 with the rebound to Covid.
- Before 2014 most of the intensity decrease was due to energy efficiency improvements (around 80%).



Source: ODYSSEE

11 types of Energy Efficiency Indicators in ODYSSEE

Type	Niveau
1. Energy intensity	Final, by sector and industry
2. Adjusted energy intensity	Final and industry
3. Specific energy consumption	By branch (industry&services) and end-use
4. Specific energy consumption benchmark	Steel, cement, paper, etc.
5. Energy efficiency indices (ODEX)	Final and by sector
6. Energy savings	Final, by sector or industry
7. Dissemination indicators	By sector
8. Intensity CO_2	By sector and industry
9. Specific CO2 emissions	By branch (industry&services) and end-use
10. Fuel poverty (New)	Residential and transport?
11. Sufficiency (New)	Rsidential and Transport

Why so many EE indicators?
Needs to monitor numerous EE Policies
Alternative EEIs in the transport sector

	l/100 km or MJ/km	GJ or toe/car	goe/pkm or MJ/pkm
Pros	• Provides the most accurate measure of technical efficiency of cars • Also reflects the impact of driving behaviour (eco-driving, speed limit) and the shift to smaller cars. • MJ/km allows to see the fuel changes (biofuel, electricity).	• Indicates how efficient the use of vehicles is (at the technical level: reduction of consumption...) • Combined with the l/100km, this makes it possible to separate the technical savings from those linked to behaviour.	• Indicates how efficient mobility by car is. • Reflects the growth of carpooling.
Cons	• Excludes part of the savings explained by behaviour (less car and more public transport in travel)	• Do not separate technical and behavioural savings	• Data in passenger-km uncertain.

Analysing energy efficiency trends related to policies requests detailed end-use data which are “beyond” the energy balance Data and indicators ODYSSEE: case of transport

- Stock and sales of vehicules by type and fuel
- Average distance per vehicle
- Passenger and goods traffic in pass-km & ton-km
- Energy consumption by mode and by type of road vehicles
- Specific consumption by vehicle (average, new)

Data

INDICATORS

- Energy consumption per capita;
- Intensity;
- Energy cons. of road transport per vehicle;
- Unit consumption per car equivalent;
- Unit consumption per vehicle;
- Consumption per unit of traffic;
- Mobility in public transport per capita;
- Share of public transport for passengers;
- Share of non-road for goods.

ODYSSEE-MURE

The Odyssee template : around 1500 time series
The exemple of the sectoral table of households (France)

Households

Dwellings | Household electrical appliances | Households heating systems | Households consumption by end-use | Specific consumption of dwellings | Data control | Selection of main indicators | Eurostat data | Gr ap

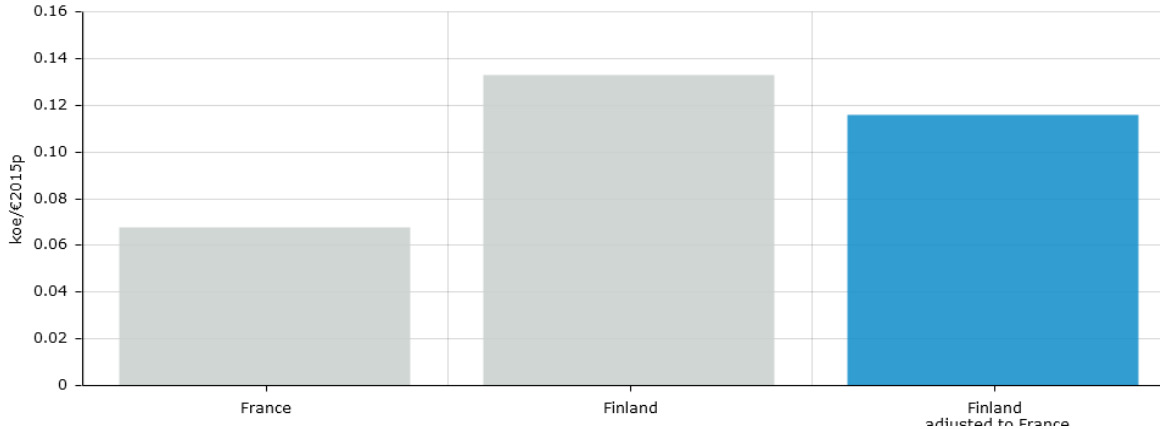
Series code	Title	Countr y code	Unit	2016	2017	2018	2019	2020	2021	2022	Source	Public comments	Private comments	Variation 2021 /2020	Variation 2020 /2019	Variation 2
	Space heating consumption by fuel															
petcfreschf	Oil products consumption of household space heating	fra	ktoe	4 217	4 148	3 685	3 430	3 216	3 306		Eurostat	Source SOES before 2010				
gplcfreschf	*of which LPG*	*fra*	*ktoe*	*384*	*362*	*350*	*301*	*255*	*412*		Eurostat	Source SOES before 2010				
holcfreschf	*of which heating oil*	*fra*	*ktoe*	*3 670*	*3 611*	*3 170*	*2 956*	*2 800*	*2 722*		Eurostat	Source SOES before 2010				
folcfreschf	*of which fuel oil*	*fra*	*ktoe*	*164*	*175*	*165*	*173*	*160*	*172*		Eurostat	Source SOES before 2010				
gazcfreschf	Gas consumption of household space heating	fra	ktoe	10 629	10 241	9 545	9 349	8 703	9 876		Eurostat	Source SOES before 2010				
cmscfreschf	Coal consumption of household space heating	fra	ktoe	35	32	25	23	20	25		Eurostat	Source SOES before 2010				
elccfreschf	Electricity consumption of household space heating	fra	ktoe	4 684	4 413	4 201	4 243	3 831	4 717		Eurostat	Source SOES before 2010				
vapcfreschf	District heat consumption of household space heating	fra	ktoe	998	979	982	991	945	1 162		Eurostat	Source SOES before 2010				
enccfreschf	Renewables and biofuels	fra	ktoe	8 523	8 370	8 308	8 681	8 293	9 934		Eurostat	Source SOES before 2010				
solcfreschf	*of which solar thermal*	*fra*	*ktoe*	*13*	*14*	*14*	*14*	*14*	*15*		Eurostat	Source SOES before 2010				
paccfreschf	*of which ambient heat (heat pumps)*	*fra*	*ktoe*	*1 709*	*1 827*	*1 879*	*2 293*	*2 416*	*3 201*		Eurostat	Source SOES before 2010				
boicfreschf	*of which primary solid biofuels*	*fra*	*ktoe*	*6 801*	*6 529*	*6 315*	*6 374*	*5 862*	*6 718*		Eurostat	Source SOES before 2010				
gbicfreschf	*of which biogases*	*fra*	*ktoe*	*0*	*0*	*0*	*0*	*0*	*0*		Eurostat	Source SOES before 2010				
toccfreschf	**Total consumption of household space heating**	**fra**	**ktoe**	**29 086**	**28 183**	**26 745**	**26 717**	**25 008**	**29 019**		Eurostat	Source SOES before 2010		**16%**	**-6%**	
	Control		*%*	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**							

Towards an “officialization of the ODYSSEE Data: new The maximum use of Eurostat data (mainly for energy)

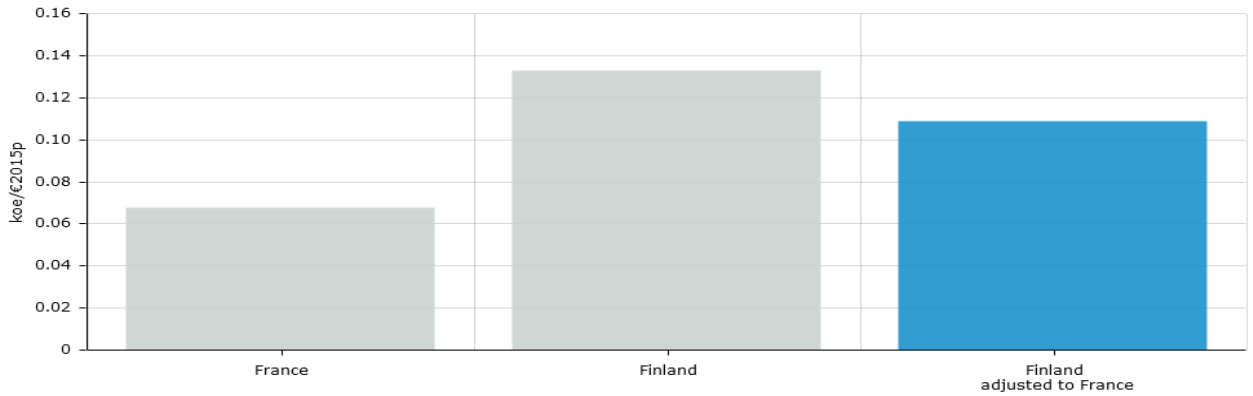
- The approach is to make a maximum use of **Eurostat** data and other “horizontal” sources (**EEA, FAO, IISI**…) → about **2/3rd** of data are collected through these sources.
- As a consequence :
  - The share of “official and harmonized is increasing
  - Data collection for National teams is simplified
  - National teams can focus on complex data, or the ones bringing added value to the project
  - The quality control is improving , gathering and controlling more data, using harmonized process

Benchmarking at macro-sectorial with adjusted ODYSSEE EEIs
Case of final energy intensities (FR, FI)

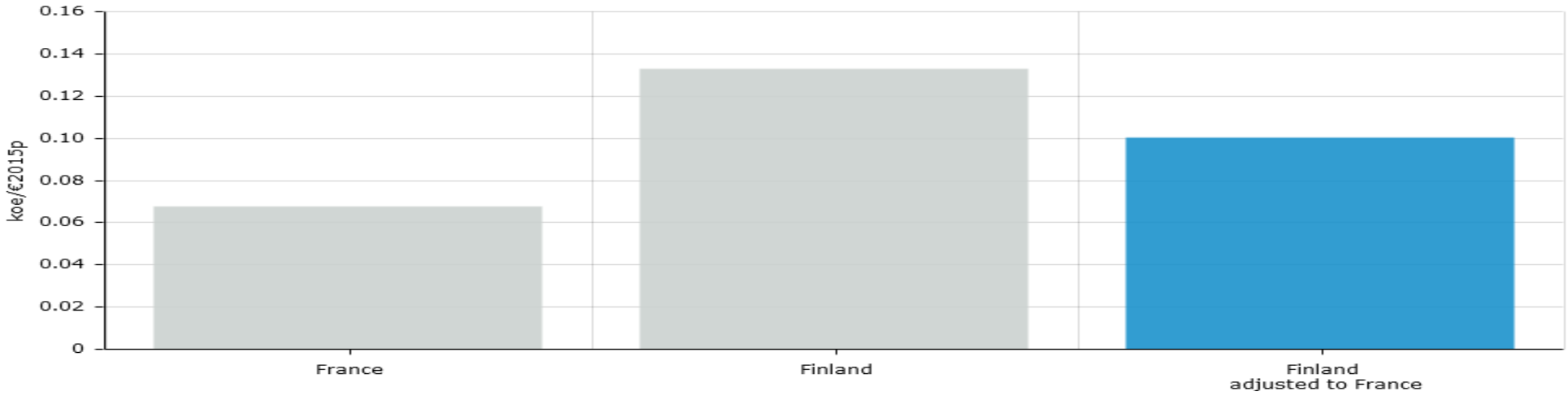
FINAL ENERGY INTENSITY ADJUSTED TO CLIMATE (2020)



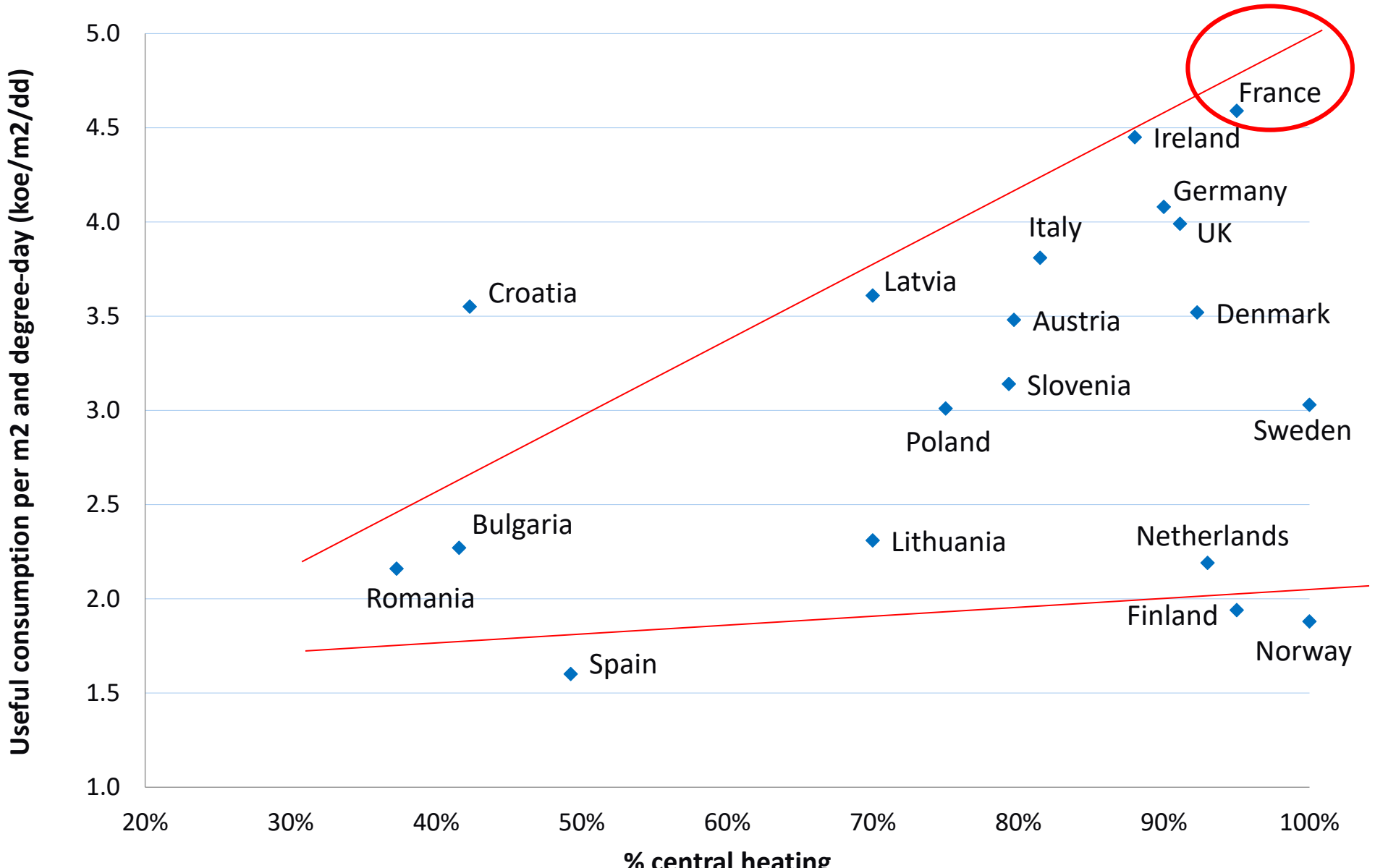
FINAL ENERGY INTENSITY ADJUSTED TO GDP STRUCTURE (2020)



FINAL ENERGY INTENSITY ADJUSTED TO CLIMATE AND GDP STRUCTURE (2020)



Benchmark of unit consumption for space heating in the EU (Koe (useful energy) /M2/DJ)

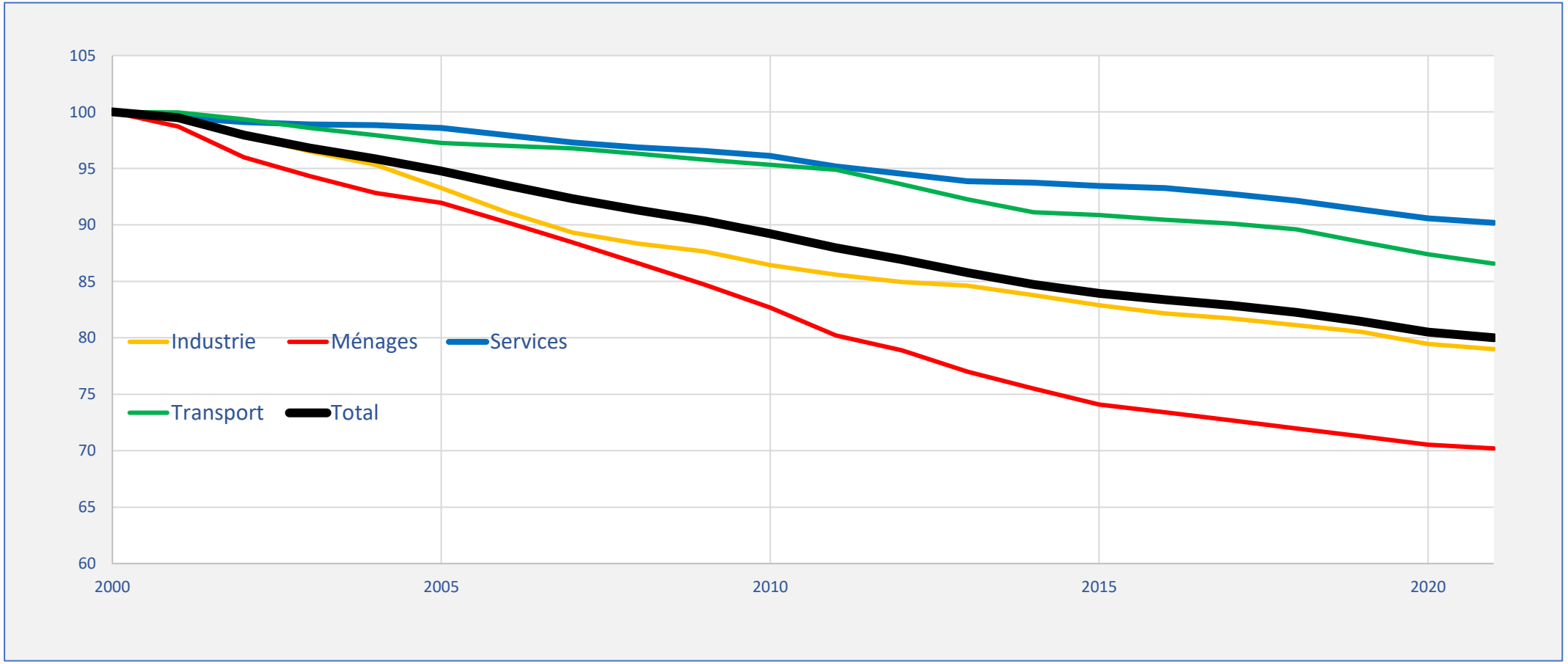


ODYSSEE-MURE

The energy efficiency ODEX (2000-2010)
Scoop : new results

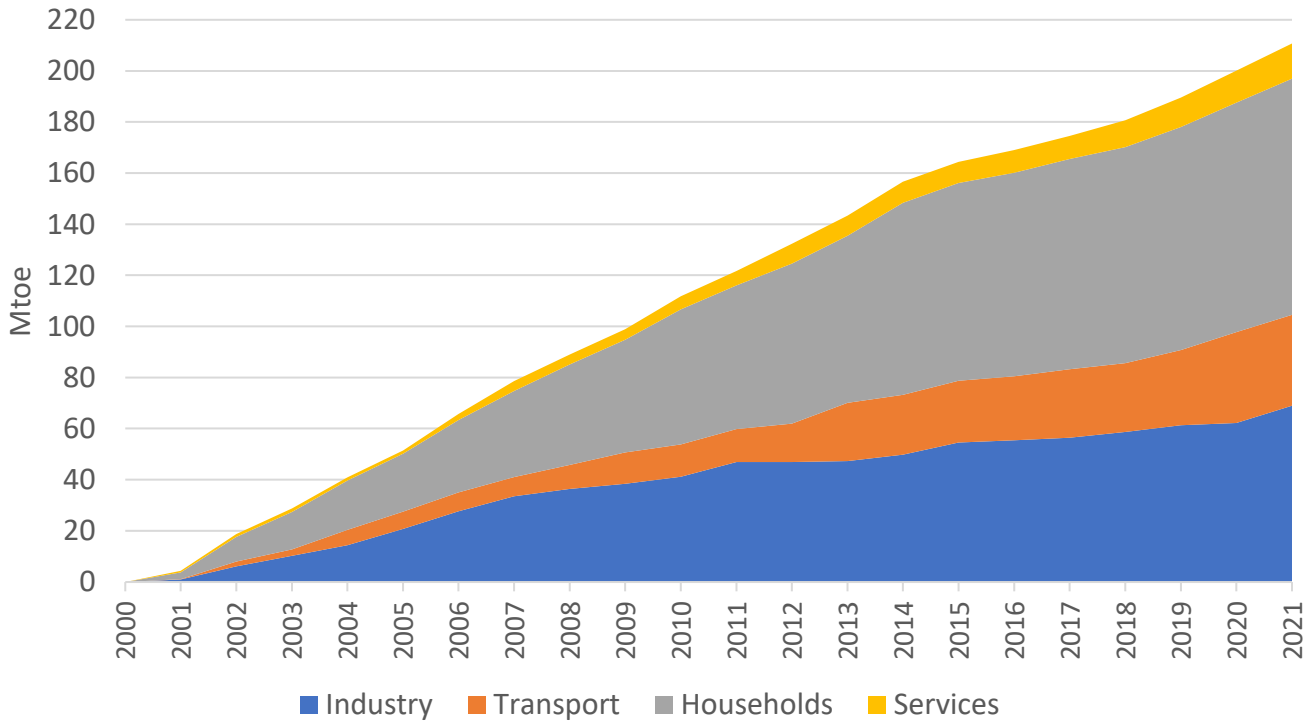
Energy efficiency index (ODEX technical EU 2000-2021)

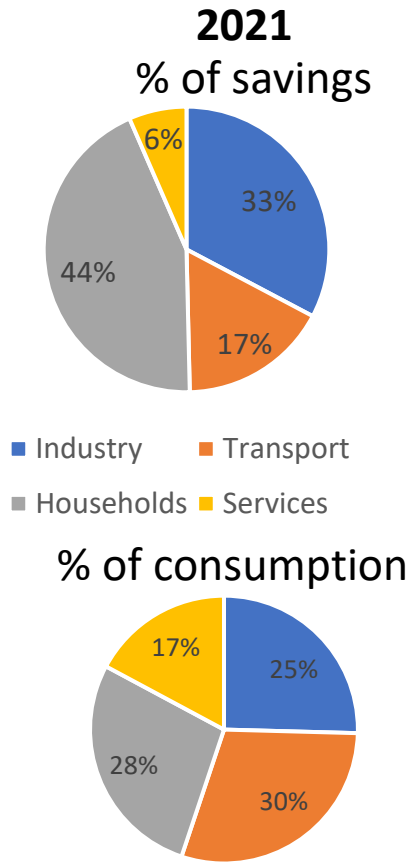
0.5% energy savings improvement in 2021 !!!!



The energy savings by end-use sectors (EU-2000-2021)

- In 2019, total final energy savings reached 190 Mtoe in EU27.
- The building sector provides half of the total energy savings
- The share of transport in these savings was only 15%, a share more than twice lower than its share in consumption (32%), due to much slower energy efficiency progress than in other sectors.



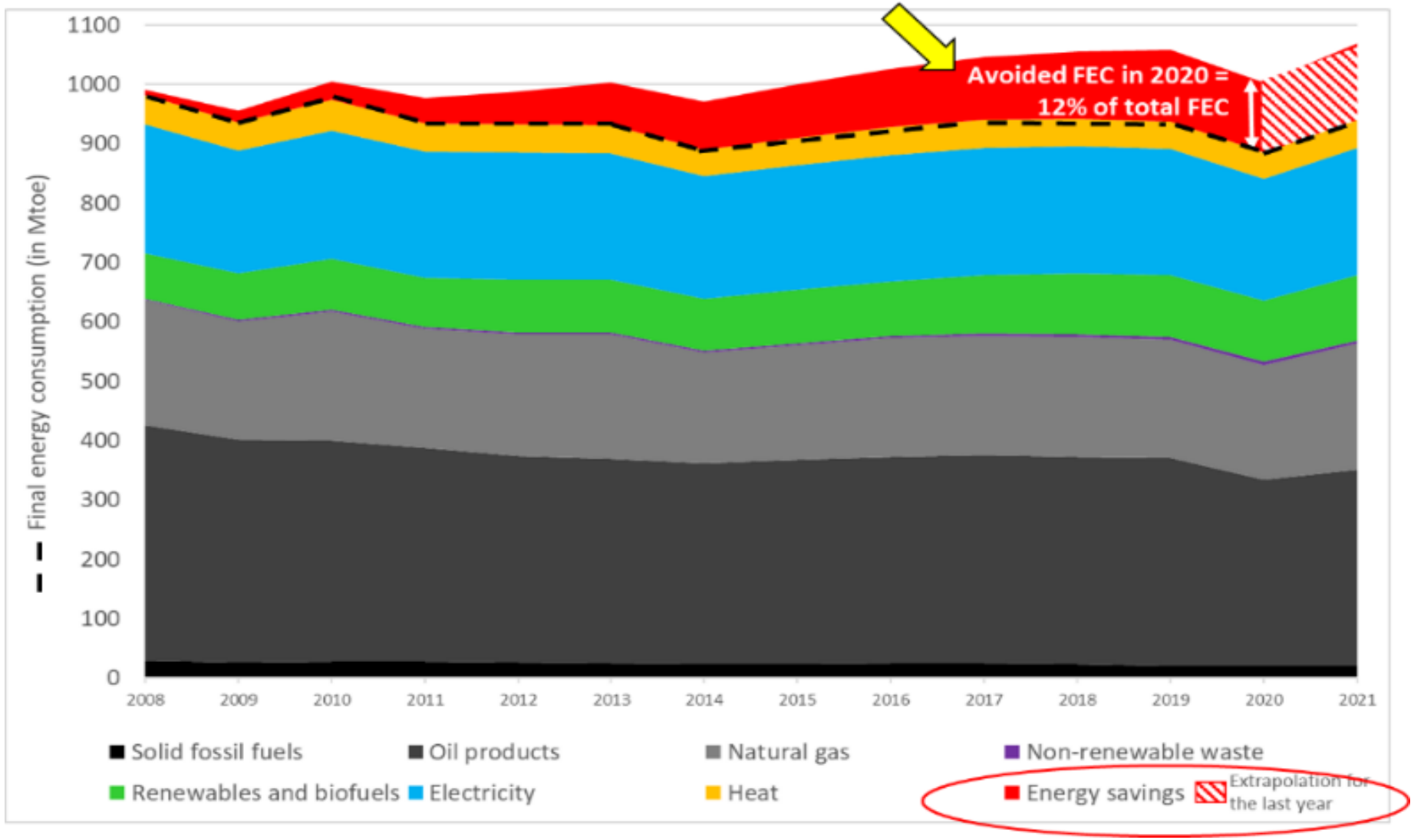


Source: ODYSSEE

ODYSSEE-MURE

Using short term indicators

Contribution of energy savings to the European final consumption (EU 2008-21)



Source: IEECP from ODYSSEE

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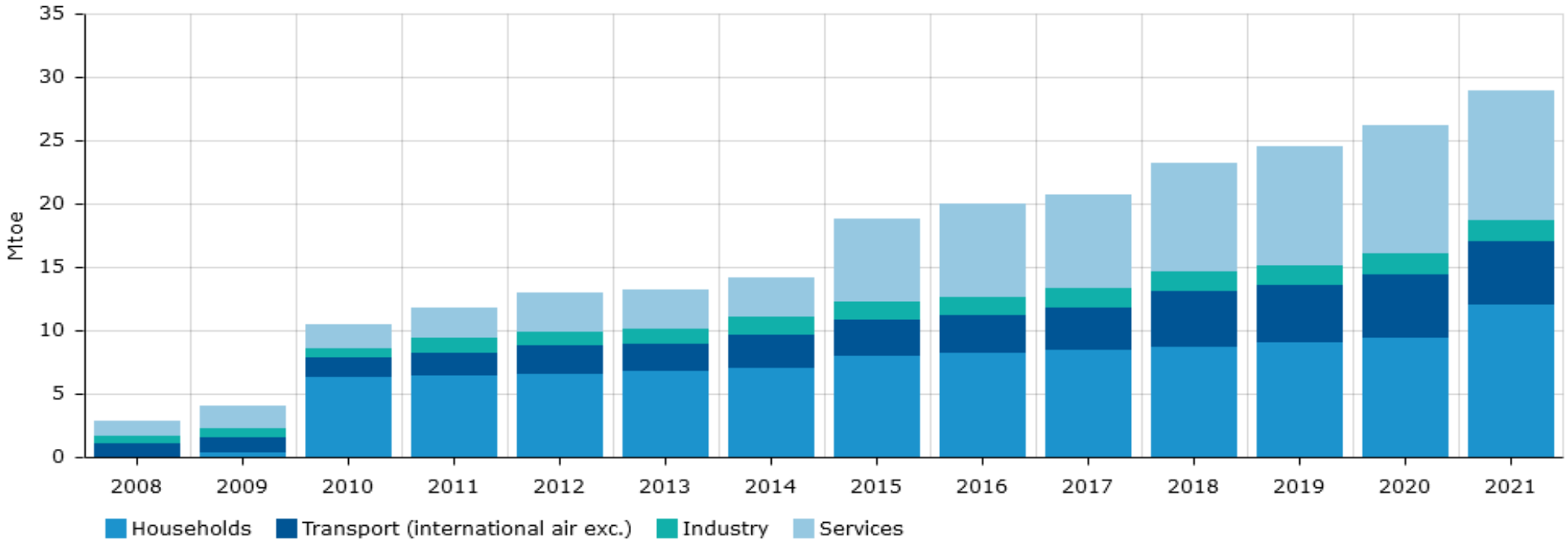
“Energy savings end-use facility”

Cumulated annual final savings (Germany, 2008-2021)



GLOSSARY

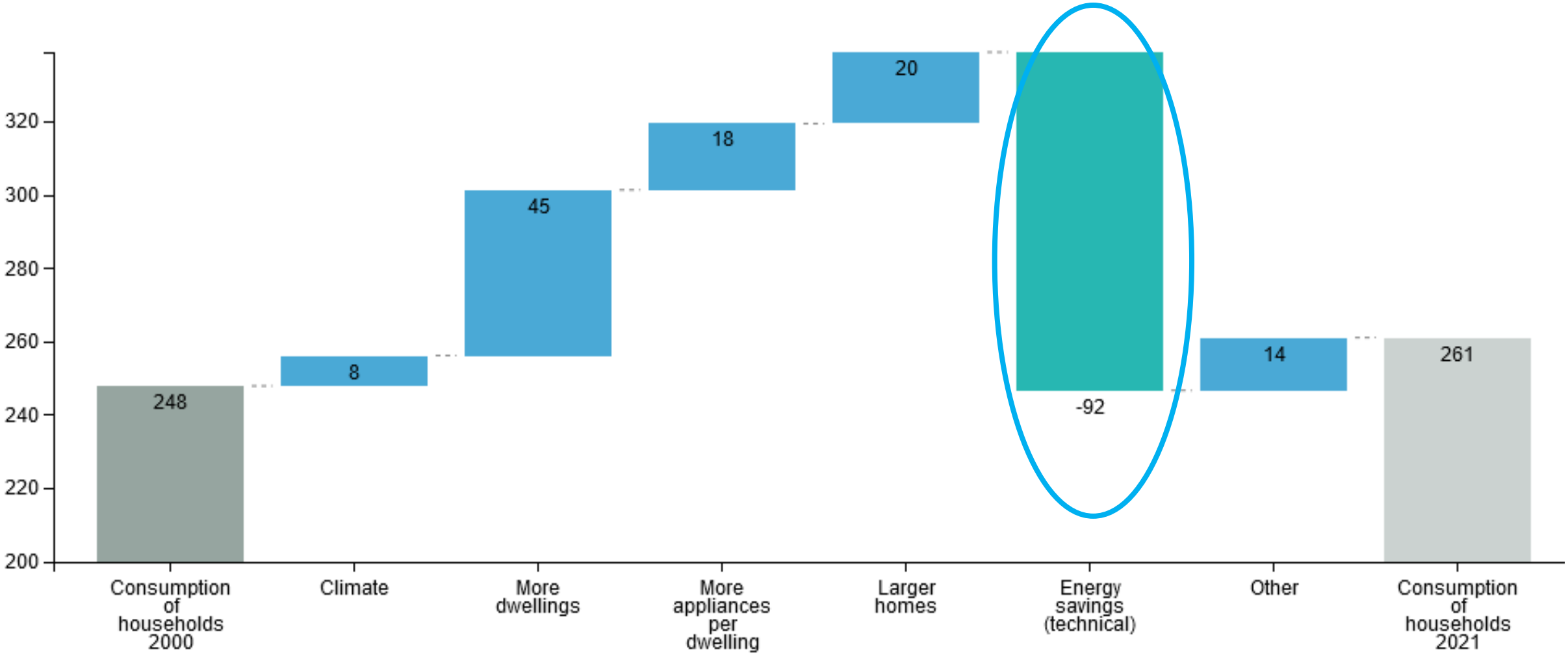
- **ODYSSEE savings**: In ODYSSEE, energy savings represent the effect of a reduction in unit consumption at the level of up to 30 sub-sectors or end-use. They are calculated year by year in reference to the previous year (“annual new savings”). The savings shown in the graph represent the annual savings cumulated over a period (“cumulative new energy savings”). They correspond to “technical energy savings” and are derived from the technical ODEX, an indicator that measures the energy efficiency progress by sector. Negative savings, mainly due to a deterioration of energy efficiency in periods of recession when factories and trucks do not operate at full capacity, are excluded. More information about ODEX.

Source : Odyssee based on Eurostat and national source

ODYSSEE-MURE

"Decomposition end-use facility"

Drivers of the energy demand variation in households (EU 2000-2021)



Source : Odyssee data base from Eurostat and national sources

The methodology is robust enough to be the core of an ISO standard

ISO 50049:2020

Calculation methods for energy efficiency and energy consumption variations at country, region and city levels

This document gives guidelines for methods for analysing changes in energy efficiency and energy consumption, and for measuring energy efficiency progress, for countries, regions and cities. It is composed of three different calculation methods:

— evaluation of structure effects in the variation of energy intensity;

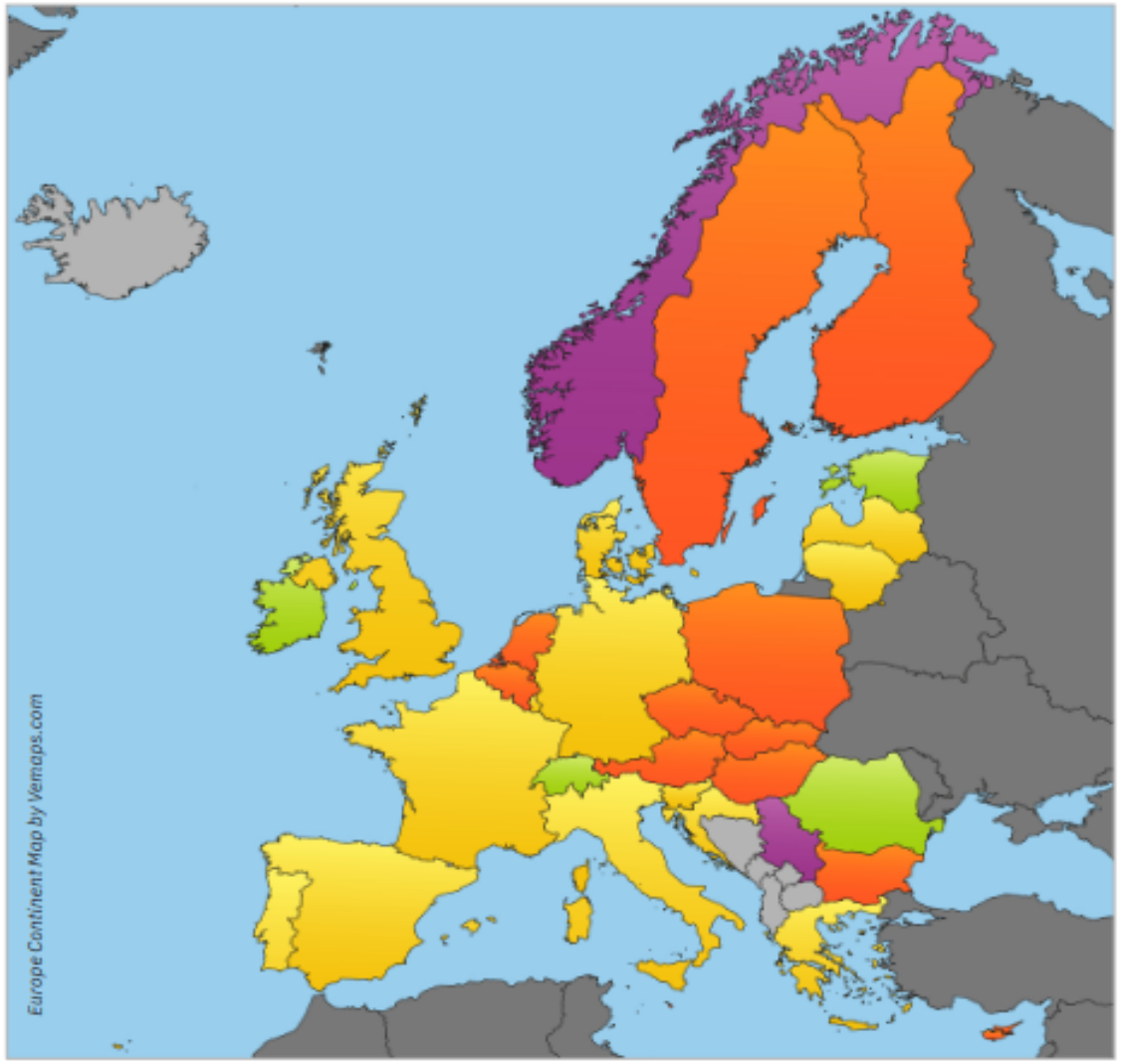
— calculation of energy efficiency indices;

— decomposition analysis of energy consumption variation.

This document is applicable to providing an aggregated statistical evaluation for a country, region or city. It does not apply to calculating changes in the energy consumption or in energy efficiency at the individual consumer's

ODYSSEE-MURE

"The European energy efficiency scoreboard end-use facility"



The Scoreboard covers 31 countries: EU, Norway, the UK, Serbia and Switzerland

Upper value
Score above 0.70 [4 countries, 2021]

Middle value
Score in the range 0.41–0.69
[13 countries]

Lower value
Score below 0.40
[14 countries including Norway and Serbia with incomplete data]

SCOREBOARD

Source : Odyssee data base from Eurostat and national sources

ODYSSEE-MURE

"The European energy efficiency scoreboard end-use facility"

Overall

Level	Trend	Policies	Combined
1: Lithuania	1: Greece	1: Estonia	1: Ireland
2: Spain	2: Luxembourg	2: France	2: Estonia
3: Denmark	3: Romania	3: Ireland	3: Romania

Households

Level	Trend	Policies	Combined
1: Finland	1: Netherlands	1: Estonia	1: Finland
2: Netherlands	2: Croatia	2: France	2: France
3: Bulgaria	3: Luxembourg	3: Germany	3: Ireland

Source : Odyssee data base from Eurostat and national sources

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Conclusions

- ODYSSEE MURE is considered as the best practice in the EU to monitor energy efficiency trends in the EU. Its methodology is broadly applied worldwide (ISO 500047);

- To properly monitor energy efficicency in relation to energy efficiency policies, a detailed data collection on energy demand and its related drivers should be performed. Relying only on « pure official data» limits the analysis, providing a « questionnable proxy » of EE.

- Since 30 years, the ODYSSEE-MURE network supported by the EC and through a collaborative process (data collection performed by national teams) provides a set of 200 harmonised, comparable and updated energy efficiency indicators (ODEX, Energy savings, decomposition, short term indicators etc.) .

- Many efforts and channels have been devoted to communicate and disseminate this analysis (ex : country and sectoral profiles, national reports, end-use facilities, policy briefs and related webinars, scoreboard, etc.)

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Annexes

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Benchmarking at sectoral level with ODYSSEE adjusted EEIs

- The adjustments made in ODYSSEE take into the following quantifiable differences between countries:
  1. Climate
  2. Fuel mix
  3. Industry structure
  4. Economic structure

- All indicators in monetary terms are measured with purchasing power parities to adjust for differences in general price level.

- A data tool enables to benchmark the countries by doing these adjustments (“benchmarking tool”) and by showing the impact of each of them individually.

The energy efficiency index to assess the energy efficiency progress (ODEX)

- In ODYSSEE, an energy efficiency index is calculated at sector level (i.e. industry, transport, households) and for all final consumers to assess energy efficiency progress.

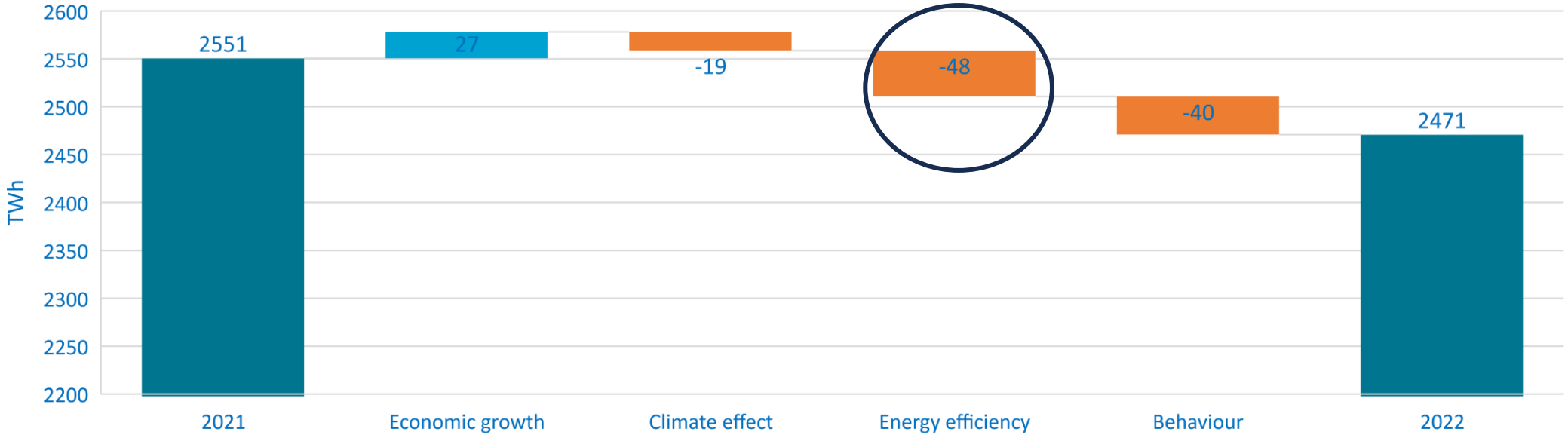
- The energy efficiency index by sector combines the trends observed in the various indicators of specific energy consumption by sub-sector or end-use, by weighting indices of specific consumption by sub-sector (or end-use) with the share of each sub-sector in the sector's energy consumption.

- Indices are used to enable to express specific consumption by sub-sector or end-use in different physical units so as to be as close as possible to energy efficiency evaluation (e.g. toe/ton, toe/IPI for industry, toe per pkm or tkm in transport, toe/m2 or kWh/appliance for households).

Short term indicators:
Electricity consumption variation at EU level in 2022

Final electricity consumption decreased by 3% in 2022 in EU:

- Warmer winter has lowered electricity consumption by 19 TWh.
- Energy efficiency improvements have saved around 48 TWh.
- These savings have been partially offset by economic growth contributing to increase electricity consumption by around 27 TWh.
- Significant behavioural changes due to energy prices increase and sufficiency policies have reduced electricity consumption by 40 TWh.

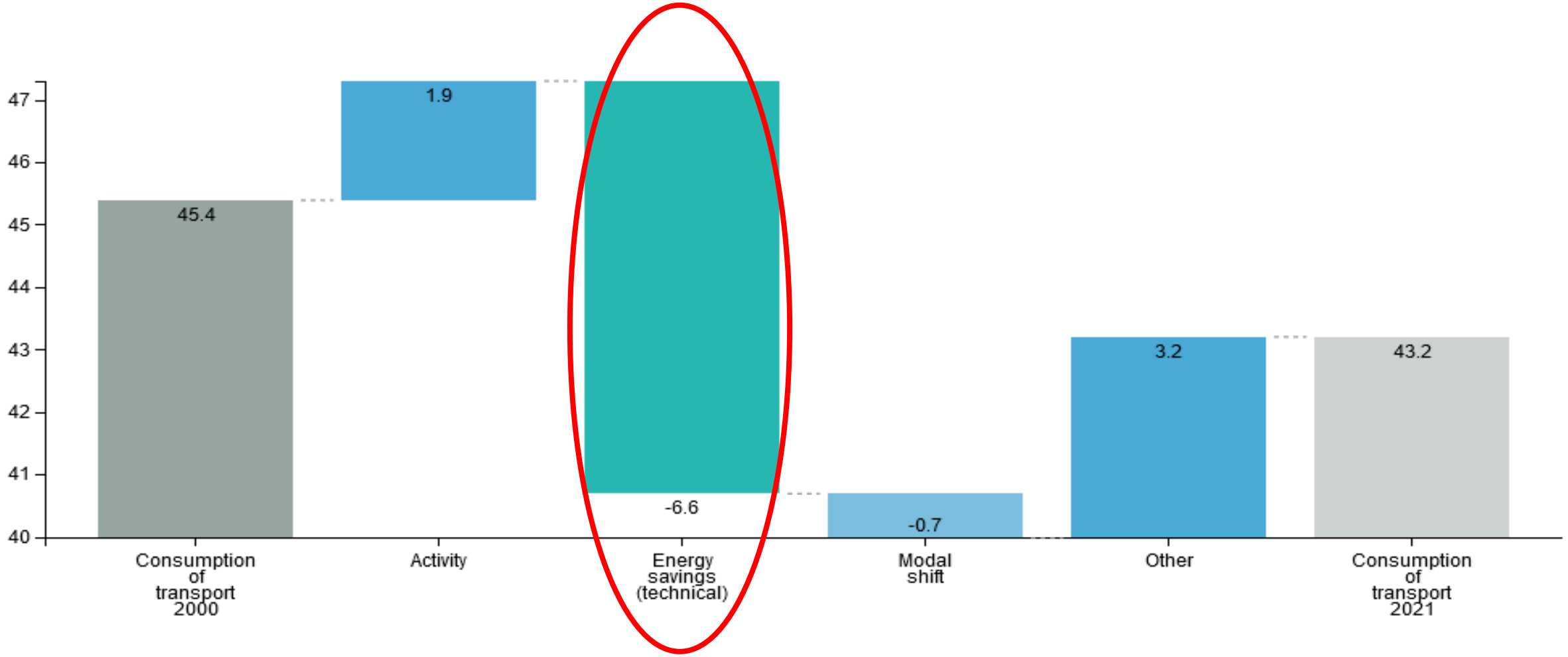


Source: Enerdata calculations from Eurostat (yearly and monthly data)

ODYSSEE-MURE

"Decomposition end-use facility"

Drivers of the energy demand variation in transport (France, 2000-2021)



Source : ADEME's national report based Odyssee data base from Eurostat and national sources

Thank you for your attention

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